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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/751,861	12/30/2000	Ralph Kling	042390.P9656	8594

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BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD, SEVENTH FLOOR
LOS ANGELES, CA 90025

EXAMINER

TREAT, WILLIAM M

ART UNIT	PAPER NUMBER
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2183

DATE MAILED: 03/25/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/751,861

Applicant(s)

KLING ET AL.

Examiner

William M. Treat

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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1. Claims 1-16 are presented for examination.
2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 9-10 and 14-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.
4. Each of claims 9-10 contain the language, "slipping the predicated instruction to a previous stage in the pipeline if the predicated instruction is not followed by the consumer instruction," and each of claims 14-16 contains the language, "if the predicated instruction is not followed by the consumer instruction in the next clock cycle then the predicated instruction is slipped to a previous stage in the pipeline". The examiner can find no statement in applicants' disclosure that "X" is the circuitry used to check to determine if the predicated instruction is followed in the next clock cycle by the consumer instruction, nor any description of how that circuitry interacts with any circuitry for slipping the predicated instruction to a previous stage in the pipeline, nor a description of any circuitry for slipping the predicated instruction to a previous stage in the pipeline, nor a description of what pipeline stage is being slipped from and what other previous pipeline stage is being slipped to. And, when the examiner read the article supplied by applicants in their IDS, "Register Renaming and Scheduling for Dynamic Execution of Predicated Code," in which two of the inventors use the term, they talk only about "slipping

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the instruction ahead” (p. 8, col. 1, line 21). The examiner finds no support in applicants’ disclosure for the language which slips the predicated instruction to a previous stage in the pipeline.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 9-10 and 14-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. See paragraph 4, *supra*, for an explanation of why the examiner is unable to understand what applicants are claiming.

8. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the processor components of claims 14-16 which determine when a consumer instruction does not follow its predicated source instruction by a clock cycle in order to permit the predicate instruction to be slipped from one pipeline stage to a previous pipeline stage and the processor components which permit the predicate instruction to be slipped from one pipeline stage to a previous pipeline stage must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Gschwind et al.

(Patent No. 6,513,109).

11. Gschwind taught the invention of claim 1 including receiving instructions in a reservation station of an out-of-order processor (col. 9, lines 15-20 and col. 9, line 62 through col. 10, line 38). At col. 23, lines 42-50, there is an example of code that shows predicated instructions and predicated consumer instructions which would be received in the reservation stations and wait there until all their source operand values were available, and they would then be dispatched to an execution unit (345) and executed (col. 10, lines 32-38). The last two instructions in the code sample shown are consumer instructions which must await the value for either register R66 or R67 generated by the other two addic instructions before being able to execute. Note that Gschwind teaches execution of predicated instructions out-of-order (col. 24, lines 8-21) and without waiting for the predicate to be resolved (Fig. 6), but their source operand values must be present before they can execute.

12. As to claim 2, Gschwind taught that the predicated instruction waits until all non-predicate dependencies are resolved (col. 10, lines 32-38).

13. As to claim 3, see paragraph 11, *supra*. Note that the values for R66 and R67, generated by the first two predicated instructions in the code cited, would not be retired to the architected register file (360), thereby making them available as source operands for the consumer instructions, until the predicate is resolved (col. 15, lines 12-15).

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14. As to claim 4, see paragraph 13, *supra*.

15. As to claim 5, applicant is claiming circuitry that can be updated to indicate the resolved status of the predicated instruction, and he names the circuitry performing this function a scoreboard. Gschwind taught functionally equivalent circuitry is part of his system (col. 8, line 56 through col. 9, line 19). It is the function of the circuitry and not the name of the circuitry which distinguishes otherwise one would need to do no more than submit an application calling an Intel Pentium computer an aardvark to secure a patent on the same device.

16. As to claim 6, see paragraph 11 and 13, *supra*.

17. As to claim 7, Gschwind taught committing the results of execution of the predicated instruction only if the predicate is true and deleting those results if the predicate is false (col. 15, lines 5-28). Note that Gschwind evaluates the actual value of his predicate in relation to whether or not his prediction is true. Applicant's system works as Gschwind's system would if Gschwind predicted all the predicates to be true.

18. As to claim 8, it fails to distinguish over rejected claims 1-4 and 6-7.

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

21. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gschwind et al. (Patent No. 6,513,109).

22. Gschwind taught the invention of claims 1 and 4 from which claim 5 depends (see paragraphs 10-14, *supra*). Applicant is claiming in claim 5 circuitry that can be updated to indicate the resolved status of the predicated instruction, and he names the circuitry performing this function a scoreboard. Gschwind taught functionally equivalent circuitry is part of his system (col. 8, line 56 through col. 9, line 19). As noted by the examiner in paragraph 15, *supra*, it is the function of the circuitry and not the name of the circuitry which distinguishes otherwise one would need to do no more than submit an application calling an Intel Pentium computer an aardvark to secure a patent on the same device. The examiner views the Gschwind reference as anticipating claim 5. However, should applicants attempt to argue his scoreboard is much more than the mere box they use to depict it in their drawings, the examiner would note Gschwind also taught in relation to his circuitry which performs the same function as that claimed for the scoreboard: "It is to be further appreciated that while the various embodiments of the present invention are described in terms of the processor architecture depicted in Fig. 3, those skilled in the art may readily adapt the present invention to other processor designs, such as variations of superscalar processor implementations or very long instruction word (VLIW) implementations." One would be motivated to apply Gschwind's teachings of a method for executing predicates in a computer processing system to such designs containing a hardware device termed a scoreboard

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to secure the advantages of Gschwind's invention while maintaining compatibility with previous product designs.

23. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gschwind et al. (Patent No 6,513,109) in view of Becker et al. (The PowerPC 601 Microprocessor).

24. Gschwind taught the invention substantially as claimed in claim 11 including a computer system comprising a processor (320, 310, 315) including a plurality of dynamic pipeline stages including at least one predicated instruction (Fig. 6), a register renaming unit (330), a reorder buffer (element 355; col. 9, lines 54-58), a plurality of execution units (340, 345, 350), a plurality of reservation stations (col. 10, lines 35-40) wherein the register renaming unit (330), the reorder buffer (355), the plurality of execution units (340, 345, 350), and the plurality of reservation stations (col. 10, lines 35-40) are coupled to at least one of the dynamic pipeline stages (Fig. 3), wherein the predicated instruction is received in at least one of the plurality of reservation stations, dispatched to an execution unit, and a result of the executed, predicated instruction is stored in the reorder buffer (see Fig. 6 and paragraphs 10-17, *supra*). Gschwind also taught a bus for his system (Fig. 6) coupling his processor (320, 310, 315) to a computer memory system (305).

25. Gschwind did not teach the bus for his system (Fig. 6) linking his processor (320, 310, 315), his computer memory system (305), and an input/output device. However, Becker taught an IBM PowerPC Microprocessor system having a processor (designated as 601) in Fig. 14, having a system bus (designated as having Address, Control, and Data components in Fig. 14) which couples the processor to the computer memory system (designated as Memory in Fig. 14) and input/output devices (designated as I/O in Fig. 14). One of ordinary skill would have been

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motivated to augment Gschwind's teachings with those of Becker since Geschwind taught no I/O capability with his system and without such capability his system has very limited utility in the real world.

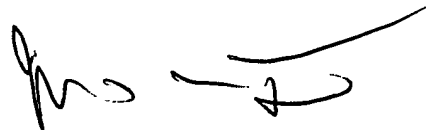
26. As to claim 12, see paragraph 22, *supra*.

27. As to claim 13, see paragraphs 10-17, *supra*.

28. Any inquiry concerning this communication should be directed to William M. Treat at telephone number 703 305 9699. The examiner works at home on Wednesdays but may normally be reached on Wednesdays by leaving a voice message using his office phone number. The examiner also works a flexible schedule but may normally be reached in the afternoon and evening on three of the four remaining weekdays.

29. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

30.



WILLIAM M. TREAT
PRIMARY EXAMINER